



PCARA Update



Volume 21, Issue 11 Peekskill/Cortlandt Amateur Radio Association Inc. November 2020

Cool developments

The most recent **PCARA Breakfast** was held on Saturday October 17, 2020 at 9:00 a.m. at Downing Park in Yorktown Heights, NY. There were 9 people present despite the chilly temperature. On that same day the **New York QSO Party** was also taking place. PCARA participated as a group that included David K2WPM, Charles N2SO, Joe WA2MCR, Malcolm NM9J, Lou KD2ITZ, and Mike N2EAB. A full report can be found in this month's *PCARA Update*. Thanks to ALL who participated!



PCARA Breakfast at Downing Park Pavilion, October 17.

PCARA was ZOOMING on October 21, 2020 at 8:00 p.m. with Todd N2MUZ's presentation "**Magic of Amateur Radio.**" There were 16 participants in the meeting which went very smoothly. It is estimated that there was a 50:50 mix of amateurs and non-amateurs in attendance. This might be the start of a series of Zoom meetings to come to help spread the message of Amateur Radio. Thanks to Todd and all who participated!

The informal **Roundtable Nets** continue Tuesday nights at 8:00 p.m., while the **Old Goats Net** remains a fixture on the W2NYW Repeater Thursday nights at 8:00 p.m. If you haven't stopped by yet, give one of them a try.

The next **PCARA Membership Meeting** is scheduled for **Saturday** November 7, 2020 at **9:00 a.m.** on the front porch of the John C. Hart Memorial Library in Shrub Oak, NY. At the meeting, there will be nominations/elections for two Director seats with terms



"Magic of Amateur Radio" was a Zoom presentation by Todd N2MUZ introducing the hobby to newcomers. It took place on October 21st.

of 2 years each, currently held by Bob N2CBH and Mike W2IG. Bring along your nominations, chairs, and masks. The membership meeting will be followed by a **PCARA V.E. Test Session** at 11:00 a.m. Please feel free to spread the word about the V.E. Test Session since they are few and far between in our region because of the pandemic.

Bring along your appetites for the next **PCARA Breakfast** on Saturday November 21, 2020 at 9:00 a.m. Location is to be discussed at the monthly meeting — possibilities include Downing Park or Uncle Giuseppe's in Yorktown Heights, NY. It may be chilly but I look to seeing each of you there.

Until we meet again **please stay safe.** Practice responsible social distancing, wear your masks, and wash your hands. It works! We are in this together, and we will get through this together. There is light on the horizon. May God bless. **EXCELSIOR!**

- 73 de Greg, KB2CQE

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Net night

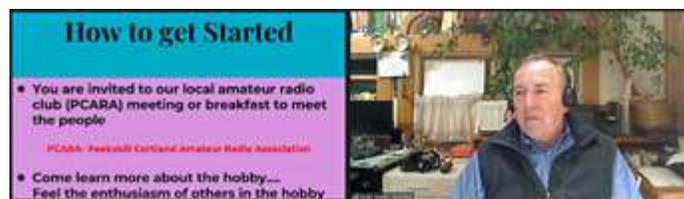
Peekskill/Cortlandt Amateur Radio Association holds a roundtable net on Tuesday evenings at 8:00 p.m. and a directed 'Old Goats' net on Thursday evenings at 8:00 p.m. Both events take place on the 146.67 MHz W2NYW repeater, offset -0.600, PL 156.7 Hz.

Join the roundtable to find out what members have been doing or join the Old Goats with net control Karl N2KZ for news and neighborly information.

Virtual presentation

On Wednesday October 21 Todd N2MUZ hosted a Zoom meeting entitled "The Magic of Amateur Radio". Lou KD2ITZ acted as co-host. The presentation was intended as an introduction for those not yet familiar with the hobby.

Lou had circulated flyers and arranged for the presentation to be listed on the calendar of the John C. Hart Library. He also asked PCARA members to inform their local schools, scouts, veterans, fire and ambulance corps about the event.



Todd N2MUZ presented the PowerPoint slides on Zoom.

As the 8:00 p.m. start time rolled around, a total of sixteen participants had joined the Zoom meeting. Roughly half were identified as radio amateurs while the remainder were not yet licensed but interested. A local Scout group was one of those invited to join in.

Todd began with "Something is in the Air", a quote from the local daily newspaper...

Today's Horoscopes

...

"**Taurus (April 20 - May 20).** Start something new and you'll find that there's plenty of fun to be had in the world of amateurs and novices. In fact, the phase where you know you're not good at it but you love it anyway is the most wonderful in so many ways."

...

(The Journal News, Friday October 16, 2020)

Todd went on to describe the many facets of amateur radio and its mixture of enthusiasts. Equipment did not have to be expensive and the local radio club can assist with initial introductions. Todd went on to describe local contacts, repeaters, short wave, satellites, APRS, weak signal modes, inexpensive kits, DXpeditions, Field Day, contests, awards and emergencies. The presentation finished with a description of FCC licensing and an invitation to find out more from local resources.



Field Day and Contesting were among the topics covered.

Everything went smoothly, with no technical problems and no interruptions. Todd proved to be an accomplished presenter as he explained the PowerPoint slides. One question about virtual examinations was answered by Lou. Let's hope the event sparks more interest in the hobby and in PCARA. The Zoom meeting was recorded by Todd for possible future viewing.

Yahoo Groups

Group moderator Lou KD2ITZ has explained to the Peekskill_Cortlandt_Amateur_Radio_Assoc group that Yahoo Groups will be shutting down in December 2020. PCARA is considering alternatives including **groups.io** (<https://groups.io/>) and **Google groups** (<https://groups.google.com>). Please let Lou know if you have any other suggestions.

Extracts from the Yahoo! notice:

Dear Yahoo Group Moderators and Members,

While we could not have been more proud of what we accomplished together, we are reaching out today with heavy hearts to let you know that we have decided to shut down Yahoo Groups on December 15, 2020.

Beginning December 15, 2020 the Yahoo Groups website will shut down and members will no longer be able to send or receive emails from Yahoo Groups.

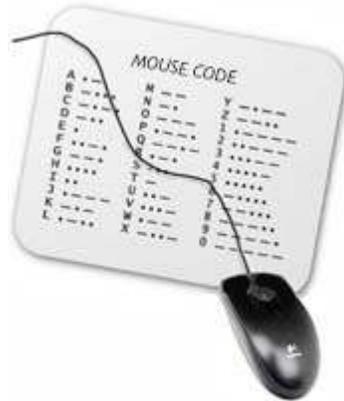
Adventures in DXing

- N2KZ

Doing Digital

Modern digital communication has always been a mystery to me. My amateur radio habits are simplistic, using quite ancient technology. I usually operate in basic CW with a straight key. No frills. Carrier on and off. Just get the message through. CW travels well through tough conditions and it is universal in meaning. No matter what language you speak, the amateur radio jargon of CW is understood. What a beautiful system!

Up until this point, I have made myself blind to most other digital modes. RTTY, Packet, Hellschreiber, Olivia, JT65, PSK31, QPSK and now FT8 have all been off my radar. All of these systems are complex and impersonal. Computers talking to computers. Where is the human aspect?



911 manual shifter.

first time. I like it!

My philosophy continues all the way up to 2 meters. I am aware that there is a community of amateurs that enjoy CW, SSB, packet, and FT8 up there... but I never paid any attention to anything except basic FM. Well, FT8 is active on 144.174 MHz. Sometimes. There is more to 2 meters than just good ole FM and repeaters. You just have to look for it. Little did I know... I was about to broaden my horizons!

Repeat After Me

Sometimes the best way to learn about new technologies is by necessity. I was called upon to install a new business band **DMR repeater**. Previously, this facility was subsisting on several dozen analog FM HTs operating on one 'itinerant' UHF frequency. Communication within a brick, steel and concrete building loaded with room after room of computer servers and a

multitude of other electronic noisemakers proved rather challenging. It was time to end all the dead spots and 'what did you say?' comments.

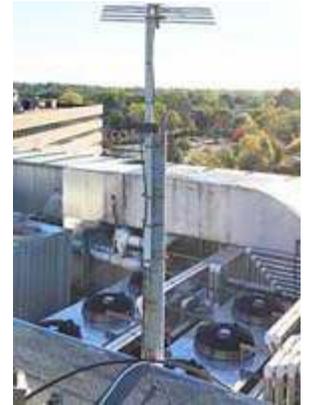
Quite An Upgrade

This would be quite an upgrade! Would a modern digital repeater be feasible in such a hostile environment? An hour-long test made our decision. We had someone stand on the roof of our building and produce a signal similar to what a repeater would offer. Using just a handheld 5 watt HT while perched 60 feet above ground, all of the dead spots magically disappeared. No matter where you wandered in our building, the person on the roof prevailed. Just think what a 50 watt repeater would do!

The HTs chosen for this project are very simple in design and features. They are capable of operating on 16 pre-programmed channels and have no more than a volume control and a push-to-talk button. No keypads or function keys will be found! Four programmable buttons for optional features are available but I chose not to use them. Straightforward operation eliminates confusion and promotes care-free use.

Channels 1 through 15 are programmed for the single DMR repeater pair. If you jostled the channel selector you would still be heard. Channel 16 is programmed for the previous analog simplex frequency. This idea served two purposes.

I had to retrieve all of the analog-only HTs and replace them with new dual-mode (analog and DMR) HTs.



View from the 60 ft high roof of Karl's building.

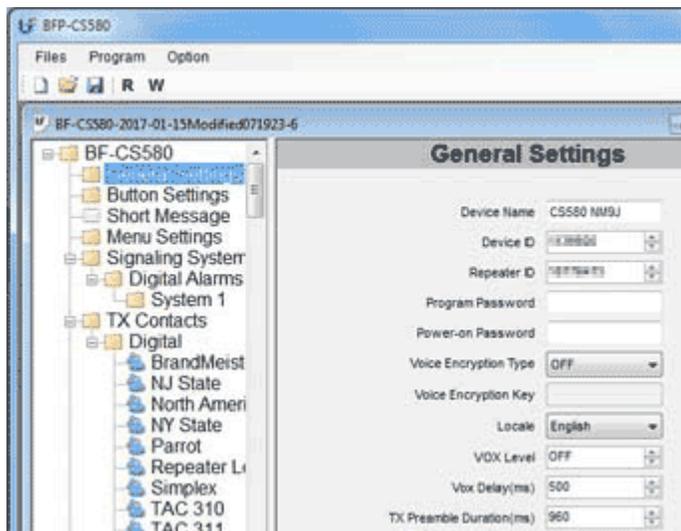


First step: assemble and test each HT... batteries, belt clips and labeling each unit. [N2KZ pics.]

During this transition, all users receiving new HTs were asked to use analog Channel 16 for compatibility before the cut-over to digital. Long-term, the simplex channel will be readily available as a ‘talk around’ for quick recovery should the repeater fail.

Programming these HTs is easy after you begin to understand all of the unit’s capabilities and how to use them effectively. To start, the configuration software reminds you just how seriously customers are about the security of their communications and their desire to keep their systems confidential.

To begin using the programming software, you need to enter a specific individual password issued by the equipment manufacturer just for your use. A second password is required for each and every HT you program that complements your overall entry password. Without two matching passwords you will not be able to write or read anything! This system also discourages you not to share your codes with others. Your codes are immediately traceable and unique. Don’t try to use them elsewhere!



Software for programming DMR radios allows a large number of settings to be entered and saved. [This screenshot is for Connect Systems’ CS580 for UHF amateur use, not the radios programmed by Karl.]

Just gaining the ability to be authorized to use the vendor’s software took some convincing. Because I had a relatively vast amount of HTs to program, it was financially prudent to ‘do-it-yourself.’ The cost of the software and necessary USB cable was certainly much less than the per-unit fee usually charged for the non-technical end user. They did not want to offer programming software to ‘someone who would make a mess’ (their words!) My credentials as an Extra Class amateur, commercial ticket holder and 50 year career in broadcast engineering came in handy. Reassured and satisfied that I understood two-way radios, I was welcomed into their fold.

Adding to the challenge was the lack of documen-

tation for the programming software. There are no ‘books’ for these programs. Retail dealers have all been trained in their use. ‘Books’ only encourage unauthorized use. Secrets should not be revealed and certainly not explained. I also sensed that the vendor was not enthusiastic to share this capability with anyone outside the scope of their jurisdiction. I was humbled by their decision to trust me with their exclusive software.

The next step was independent self-study and revelation. I began with a day or two of trial and experimentation to understand the design of the HTs and the repeater and discover what features I could use and appreciate. My learning continues to this day. I am still uncovering what can be done with some of the deep menu choices — and it really is fascinating!

To broaden my fluency of the vast world of digital radio, I called upon a fellow ham for advice and guidance. Larry Berkowitz, W2LGB, has been an authority on all things amateur and digital for years. His wealth of knowledge regarding DMR, System Fusion, D-Star, Wires X and NXDN is astounding. Larry opened many windows of understanding for me as I launched into this new digital world. A handful of kindred and patient explanations and guidance goes a long way. Thanks, Larry!



Larry, W2LGB.

Are there many digital two-way radio ‘standards’ beyond DMR? There are so many that you can barely count them all! Yaesu’s System Fusion, Japan Amateur Radio League’s D-STAR, Project 25 (P25) also known as APCO-25, Kenwood and Icom’s NXDN NEXEDGE®, Motorola’s MOTOTRBO™ solution (closest to DMR) and dozens of variants on each. This is a true instance of the adage ‘No standard is our standard!’

Proceed to Program

After completing my novice orientation regarding DMR, I felt confident to jump into my first attempts programming my HTs. One essential part to learning digital is to understand new vocabulary. When you configure, write and save a set of attributes, the result is called a ‘code plug.’ Oh, I was so naive! I went to the ‘Channel Information’ tab and entered the basic information for my needs. Input and output frequencies and a few check boxes should be all I need to get this going, right? Will this be easy? I loaded up my first code plug and created an immediate ‘zonk!’ You need more than this to make a DMR system work.

After a few tries adding and subtracting other attributes, I learned the elementary need to create a ‘Zone.’ A zone is a virtual neighborhood for your

system to do business. Without it, your code plug will simply not work. Creating a complete and correct code plug results in a unique key just like those notched pieces of brass hanging from your key chain.

You need to get many, many software options to align before you enjoy a working system. The complexity of configuration was created for a reason. If you manage a large public service or business communications system, you need tools to manage and maximize the efficiency to your needs. DMR rises to this occasion and succeeds with grace and style.

The more I learned about DMR the more I was impressed. It is a complicated system but it is capable of so much in a thoughtful and efficient manner. Getting on the air with DMR is several levels above what you would accomplish with an analog amateur radio HT. For instance, you will learn all about zones that will allow you to tailor precise workgroups and permissions between all your users, much like the sophistication of LAN topography. DMR options are nearly infinite. The elaboration of your design is limited only by your imagination.

You can create regular groups, emergency groups, zone lists, scan lists and channel attributes for each and every HT in your system that are completely individual to that one HT — or all your HTs — and everything in between. This takes the concept of routing to a new level. A complete complex hierarchy can be achieved. Occasional users or important users can intermingle with common daily workers. Occasional temporary ‘Lone Workers’ have a place, as well. Vast attributes can be combined into “One Touch Access” groups. I should also mention that many digital transmission systems are capable of simultaneous signaling and other data along with the audio content an end-user can hear. It goes on and on. So much to learn!

Let’s add one more thing about DMR. Using a standard 12.5 kHz channel, DMR allows you to have *two* individual conversations going on simultaneously! In technical lingo, this is known as TDMA – time division multiple access. Your single carrier switches back and forth between two ‘time slots’ or ‘time tiers’ (T1 and T2) every 30 milliseconds. How about that for spectrum efficiency? More to configure!

In turn, each and every HT and repeater requires assignment to a CC ‘color code’ which provides a digital version of privacy filtering just like the PL tone encoding and decoding used on most analog FM repeaters. Combine this with unique digital radio IDs and user DMR IDs and you will quickly understand just how powerful and defined DMR can be. Your communications become quite encrypted and private. DMR’s complexity gives you complete control when participating in vast operations and simple ones, too.

Amateur Additions

Not enough? When used for amateur radio, DMR installations can expand into worldwide interconnections. Install a C-Bridge (<https://rayfield.net/c-bridge>) and you can connect with a tremendous network of other DMR groups via the Internet. Adding complication, some systems use another method of interconnection based on software called BrandMeister

(<https://brandmeister.network/>) with its own IDs and necessary configurations.

Why does everything need to be so complex? Think of C-Bridge and BrandMeister as digital versions



Rayfield Communications' c-Bridge.

of the popular analog system called ‘Echolink.’ Imagine calling across the planet with a perfect digital connection wirelessly. These digital interlinks make it happen.

There are many other attributes to arrange and consider to get an amateur DMR transceiver up and running. Your very first move is to become registered with a DMR ID. Larry, W2LGB, suggests to actually apply for **two**: One for your portable rig and one for your mobile rig. DMR IDs are assigned without charge at <http://www.RadioID.net>. Without this ID, you will not be admitted to any DMR repeater or system.

Many lists need to be written and entered to allow your access to desired groups and features. You need to define the contacts you wish to converse with. A roster of the repeaters you would like to use, including all frequencies, color codes, time slots, contacts and receive groups all have to be accurately described. Your zones must be notated, as well. It is a detailed project that requires patience that you may build over time providing you have the software to do so. No wonder newcomers are always asking established users for beginner code plugs!

An essential element is the assignment of *talk-groups* or simply TGs. Joining a talkgroup is like joining various amateur radio clubs. They may focus upon a geographic area, a specific interest or a group of people for convenience.

For example:
Group 3 is ‘North America – All,’
Group 505 is ‘Australia,’
Group 3136 is ‘New York,’
Group 3109 is ‘Southern New England,’ and so on.



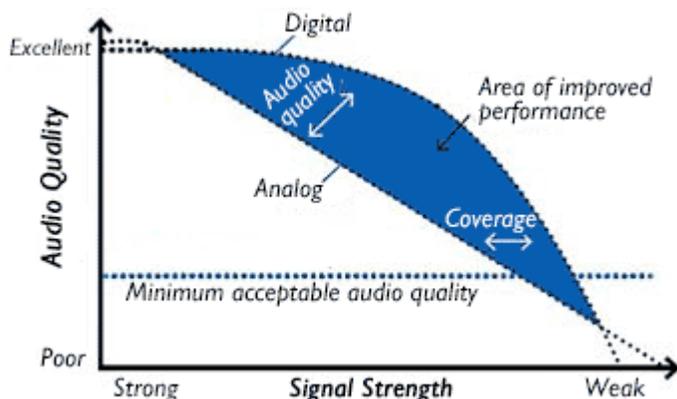
DMR-MARC regional talkgroups for USA.

I've Grown Accustomed to Your Sound

Spending time using a DMR system introduces you to every nuance of its personality and style. All the digital processing necessary from transmission to the repeater and then reception from the repeater produces a sizeable time delay. Speak into your HT with a nearby digital two-way radio listening in and you will hear a confusing 'Yankee Stadium' echo... echo... echo. The first few days after our cut-over was filled with people having fun experimenting with this effect.

The signature of DMR audio takes a little getting used to. The transmission jumps back and forth between two time slots every 30 milliseconds creating a somewhat unnerving wobbly, heavily processed sound to the received transmissions. The audio sounds compressed, flat and loud. It was obviously designed to be heard quite reliably and it succeeds in this quest.

Field strength needs to decay severely for the signal to drop out, but when it does you will hear the 'cliff effect.' Now you hear it perfectly... now you don't! If you listen to a DMR transmission on an old-fashioned analog scanner it sounds like a subtle pit-a-pat of ticking quite different than the loud beehive buzz I have heard on local digital amateur radio repeaters on 2 meters and 70 centimeters.



Performance comparison of analog-FM versus digital-DMR. Background noise is reduced with digital, as noise and interference are screened out more effectively. This occurs all the way to the edge of coverage — giving clearer audio than analog at greater distances. [After Tait.]

In the world of digital wireless, relative signal strength is measured with one of two metering systems: **RSSI** (Received Signal Strength Indicator) and **RCPI** (Received Channel Power Indicator.) The mission of these systems is to decide when incoming signals are completed and, in turn, when to transmit a clear-to-send command to continue. RCPI is a refined version of the RSSI concept. RSSI is much like using a very basic S-meter where simple relative signal strength is read. RCPI takes the concept further by basing its readings against true perceived levels of RF power as received from a source.

Review the Results

With our repeater now in use, all of the annoying dead spots and lost communications disappeared. We jumped from simplex at 5 watts (at best) using well-worn rubber duck antennas to new HTs feeding a 50 watt repeater linked to a compact antenna up 60 feet. The field strength became beyond authoritarian. There is no doubt you will be heard! With a DMR HT in hand while driving home in my car, I could keep contact with the repeater from almost ten miles away. Not bad for a concealed device in a moving car! I wonder how far I could go with a proper mobile antenna?

This article can only provide a casual first introduction to the world of digital wireless communications. I have only just begun to gain first experiences with this intricate world. To continue your learning, please visit another useful introductory site:

<https://www.dmrfordummies.com>. How the world has changed since the advent of hand sent dots and dashes in the 19th century! Are you ready to join the world of digital radio? It might be beneficial to introduce yourself. I managed to install a DMR repeater system with three dozen clients. I bet you could, too. Digital radio is here to stay. You should get to know it... It's got quite a buzz!

Reminder

Don't forget to listen in to PCARA's roundtable net on Tuesday evenings and our Old Goat's Net on Thursday evenings. Both nets begin at 8:00 p.m. on our 2 meter repeater at 146.67 MHz with a minus 600 kHz offset and a 156.7 PL. Check our Facebook page (<https://www.facebook.com/pcaahamradio>) and List Server for the latest updates on all of our meetings and other activities. All licensed amateurs are always welcome to join us on the air.

Until next month, Happy Thanksgiving and see you on the air! 73 and dit dit de N2KZ 'The Old Goat.'



UHF repeater antenna mounted on roof of Karl's building.



Narrow Band Emergency Messaging Software - KD2ITZ

Need for NBEMS

Recent global events underscore the significance of ham radio for individual and community preparedness. Emergency Communications (EmComm) groups within amateur radio have long recognized the advantages of using a computer to send messages instead of relying on spoken words.

Narrow Band Emergency Messaging Software (NBEMS) describes several programs that can exchange data using various digital modes. NBEMS has evolved over time to meet the demands of EmComm groups and their served agencies. It is used in emergency operations centers across the nation. Recreational hobbyists continue to enjoy the powerful resources developed in this evolving landscape, but may benefit from an overview of NBEMS for emergency message handling.



NBEMS is utilized by EmComm groups in NY and beyond. [Image: NYS DHSES]

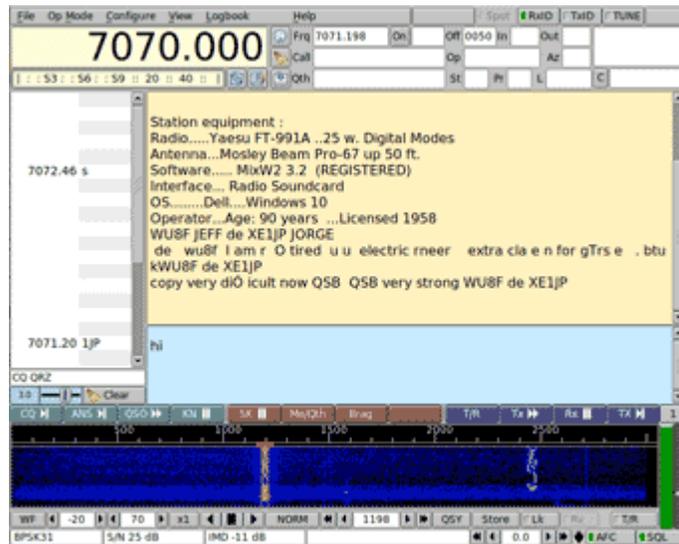
Forward Fldigi

Fldigi is the principal software used for NBEMS. Many readers have likely heard of the program and used it for 31.25 baud phase shift keying (PSK31). Fldigi stands for Fast Light Digital Modem Application. It allows data transfer with tones generated and decoded by a computer sound card.

Fldigi supports over a dozen digital communication modes, each having individual advantages. The program is free, open-source, and available for all major operating systems. Fldigi is part of a suite of applications too numerous to list in this article. The software was developed by a team led by Dave Freese W1HKJ and was initially released in 2007. More information can be found on his website: <http://www.w1hkj.com>



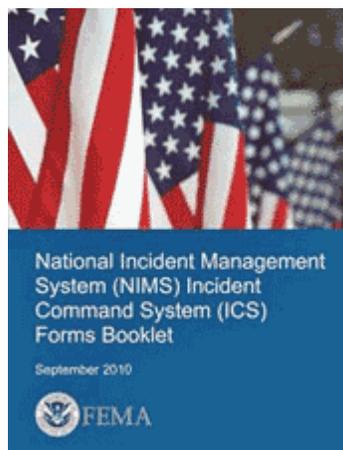
Dave Freese, W1HKJ.



Fldigi program decoding PSK31.

Related programs

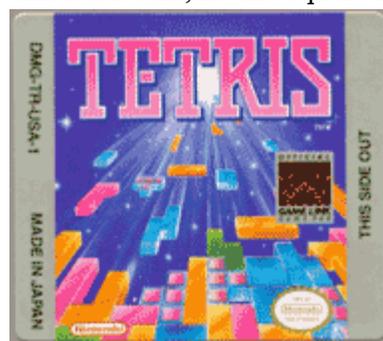
Fldigi is typically associated with keyboard-to-keyboard communications. EmComm groups frequently exchange standardized forms, such as FEMA Incident Command System (ICS) forms or National Traffic System messages. Flmsg software allows users to easily send, receive, and edit common forms.



NBEMS facilitates the transfer of common forms from FEMA and other organizations.

Accuracy is essential for EmComm data exchange. Flamp software transmits files by breaking them into blocks which are automatically assembled by the receiving station.

Based on band conditions, the sender can choose to repeat the blocks up to ten times per transmission. Error detection information is included for each block. If a receiving station has missed blocks, it can request a retransmission from the sender by using the report function. Flamp is an acronym that stands for Fast Light Amateur Multi-cast Protocol. As the name implies, the software is optimized for situations where one station is transmitting files to multiple receivers.



Like a game of Tetris, Flamp assembles messages from individual blocks.

Flarq is a program that is designed for communications between only two stations. The software utilizes a file transfer utility known as Automatic Repeat reQuest (ARQ). Receiving stations send acknowledgments when information is successfully decoded, and sending stations automatically retransmit data when acknowledgments are not heard. In addition to the transmission of common forms, the software facilitates the exchange of email between stations.



Flarq software can facilitate email exchange over the air. [pic: Warner Brothers]

Many modes

NBEMS allows operators to select from a wide array of digital modes. Attention should be given to FCC bandwidth and symbol rate limits.

Band	Maximum baud
160 - 12 meters	300
10 meters	1200
6 - 2 meters	19600
1.25 meters - 70 cm	56000

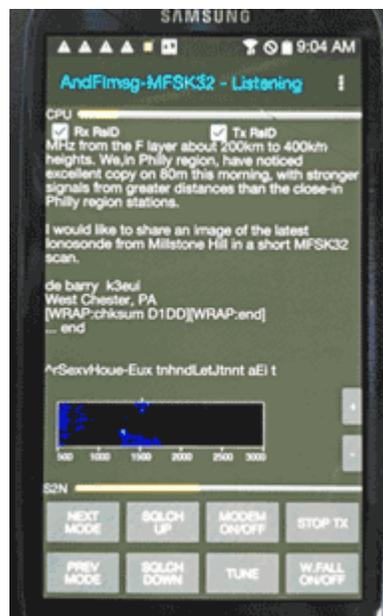
Maximum symbol rate in baud for MF, HF and VHF/UHF amateur bands.

Some regularly used modes include: PSK, MT63, MFSK, THOR, and Olivia. PSK is commonly utilized in robust mode (PSK-R) which employs error correction. Transfer rates are often set between 125-500 baud, but multiple carriers can be transmitted simultaneously for additional speed. MT63 is a mode that is known for reliability despite tuning errors and varied audio levels. It is so forgiving that it can be used in the absence of a hardwired sound card interface. Operators can simply locate the radio speaker near the computer microphone and vice-versa. It is an excellent mode for transferring data over FM repeaters. MFSK, THOR, and Olivia are often used on HF. THOR and Olivia are known for successful decoding of weak signals over 10dB below the noise floor. Automatic identification of modes is facilitated by including the Reed-Solomon Identifier (RSID) with the transmission. It allows Fldigi to automatically switch to the appropriate mode at the receiving station.

Practice, practice, practice

Confusion is easy among the jumble of acronyms and abbreviations for modes and applications, but they say practice makes perfect. Emcomm groups across the country welcome participants to NBEMS exercises. Several nets are listed on the Northern NY ARA web-

site: <http://nnyara.net/ecom/>. When I recently participated in the NY-NBEMS Training Net, I was one of over 20 stations on-air. My rig is a Kenwood TS-590, which was interfaced to a computer running Fldigi on Linux. I also decoded data by directing the rig's audio through the microphone of a mobile phone (no hardwired connections), which was running NBEMS software for Android (AndFlmsg).



NBEMS can run on mobile devices such as this Samsung phone.

Throughout the country, hams volunteer their time and expertise to offer NBEMS to served agencies at no charge.

The software is excellent and the communications are reliable. It would cost countless sums of money to implement a commercial solution that could match it. As the government considers the reallocation of amateur bands for other uses, it is essential that everyone is familiar with the vital services provided by hams. Try NBEMS at your home station. Not only is it important to the future of amateur radio, it is a lot of fun.

- Lou KD2ITZ

V.E. Test Sessions

PCARA's previous test session took place on Saturday September 26 on the porch of John C. Hart Memorial Library. Henry KD2UPD upgraded from Technician to General while Brian Pouliot of South Salem NY passed the Technician Examination. Brian has now been issued with new call **KD2UTY**.

PCARA's next test session takes place on Saturday November 7, starting at 11:00 a.m. on the porch of the John C. Hart Library. All candidates are asked to contact V.E. Team Liaison Mike W2IG before the event using e-mail address w2igg@yahoo.com.

Meanwhile Westchester Emergency Communications Association has recommenced testing at a new location. WECA's next session is on Saturday November 14, 10:00 a.m. at Masonic Guild of Mount Kisco, 11 Carpenter Ave, Mount Kisco NY. Candidates must contact Stan Rothman WA2NRV (914) 831-3258, wa2nrv@weca.org.

Antenna Book extras

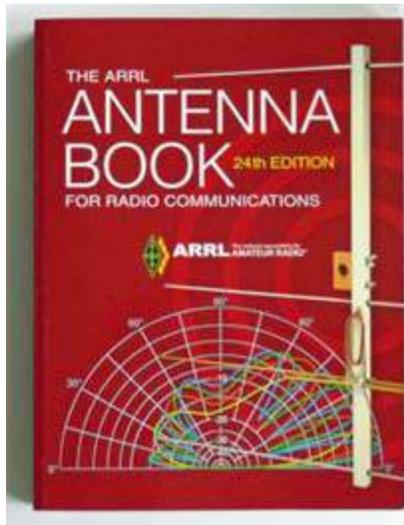
If you were to examine my groaning bookshelves, you would see several handbooks published by ARRL. The **ARRL Handbook** was covered in January 2020's *PCARA Update* article "Handbooks I've Known". The second ARRL "Bible" is their **Antenna Book**, providing the authoritative word on everything antenna-related for the Radio Amateur.

My shelves hold thirteen copies of the *ARRL Handbook*, but only five copies of the *ARRL Antenna Book*. This is partly because new editions of the *Antenna Book* are only published every few years. The first edition was printed in September 1939, while the current 24th Edition appeared in October 2019 — a span of 80 years, and an average time between editions of 3½ years. Another reason for fewer *Antenna Books* is that antennas do not change quite as quickly as our high-tech radios.

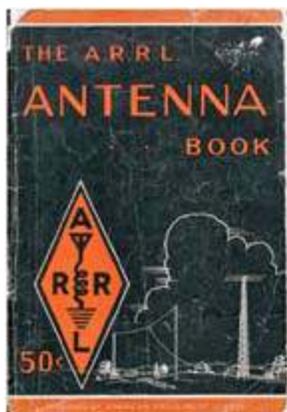
I decided to order the latest *Antenna Book* — but first, let's take a look at some earlier editions, with an emphasis on the added extras.

The original

The very first ARRL *Antenna Book*, published in 1939, was a slim volume of 139 pages costing 50 cents. It was edited by George Grammer W1DF and Byron Goodman W1DX. Some of the chapter titles: "Wave Propagation", "Antenna Fundamentals", "Ground Effects" and "Multiband Antennas" are topics which still appear today. Other chapters were on "U.H.F. Antennas" and "Feeder Systems". In those far-off days "UHF" meant frequencies as high as "112 Mc", at a time when open wire transmission lines employed wooden spacers boiled in paraffin for water resistance.



The current ARRL Antenna Book, 24th Edition.

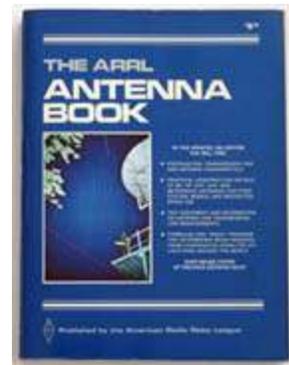


The very first ARRL Antenna Book, 1939.

Fourteenth first for me

My first copy of the ARRL *Antenna Book* was the 14th edition, published in 1984. Some newer topics not included in the 1939 edition were: "Multielement Directive Arrays", "HF Antennas for Restricted Space", "Portable and Mobile Antennas" and "Antennas for Space Communications".

No computer media were included in the 14th edition — but there was a **program listing...** "BASIC Language Program for Determining Bearings and Distances" — intended for a Radio Shack TRS-80 Level II computer. It calculated great circle bearing and distance between two stations when their latitudes and longitudes were entered.

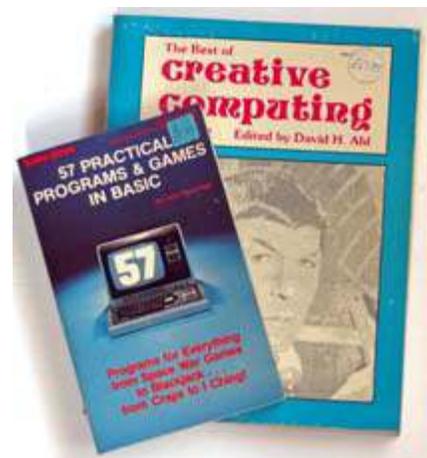


Fourteenth Edition.

```
Table 2
BASIC Language Program for Determining Bearings and Distances
10 REM *** BEARINGS/DIS ***
15 REM A=YOUR LAT.
20 REM B=OTHER STATION LAT.
25 REM C=BEARING ANGLE
30 REM D=DEGREES OF ARC
35 REM E=INTERMEDIATE VALUE
40 REM K=CONVERSION CONST. ARC TO KILOMETERS
45 REM L=DIFF IN LONGITUDES
50 REM L1=YOUR LONG.
55 REM L2=OTHER STATION LONG.
60 REM N=CONVERSION CONSTANT, DEGREES TO RADIANS
65 REM N=CONVERSION CONST. ARC TO NAUT. MI.
70 REM S=CONVERSION CONST. ARC TO STATUTE MI.
75 REM V=STRING VARIABLE
100 CLS
110 PRINT"PROGRAM TO CALCULATE GREAT CIRCLE DISTANCES AND BEARINGS"
120 PRINT
130 PRINT"BY J. HALL AND C. HUTCHINSON, ARRL HQ, JULY 1981"
140 PRINT"THIS PROGRAM IS NOT COPYRIGHTED AND MAY BE REPRODUCED FREELY"
150 DEFDBL A,B,C,D,E,L,M,DEFSTRY
160 D=1 K=111.11 N=57.29577951388238 N=60 S=69.041 V="***** "
```

Partial BASIC program from July 1981 for Great Circle calculations — from ARRL Antenna Book, 14th Edition.

That 39-year old listing, produced on a dot matrix printer, takes me back to the days of typing in code from books and magazines for early home computers such as the Commodore PET and IBM PC clones. There were programs to calculate Maidenhead Locators, to score VHF contests, to receive RTTY and to calculate component values for Pi-networks, attenuators and bandpass filters.



Books and magazines from the late 1970s and early 1980s contained program listings in BASIC.

If you ever get misty-eyed for those simpler times, you can find free emulators for GW-BASIC that run on modern computers, for example at: <https://sourceforge.net/projects/pcbasic/> .

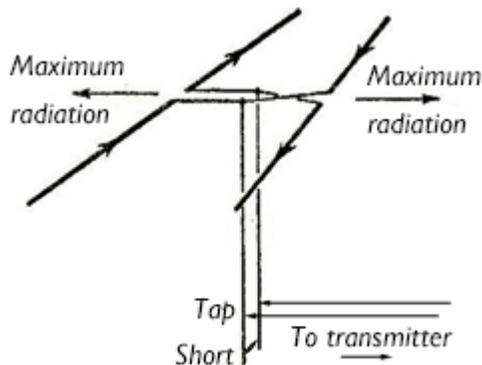
Number fifteen

The 15th Edition *Antenna Book*, published in 1988, also contained no computer media, but had a unique opening. The Foreword after the title page was written by flat-top beam inventor John Kraus W8JK (SK), who was Professor of Electrical Engineering and Astronomy at Ohio State University and Director of the University's Radio Observatory. John Kraus was author of the famed textbook 'Antennas', first published in 1950 by McGraw Hill. In 1988 he had just completed an enlarged second edition of *Antennas* and wrote for ARRL:



John D. Kraus W8JK.

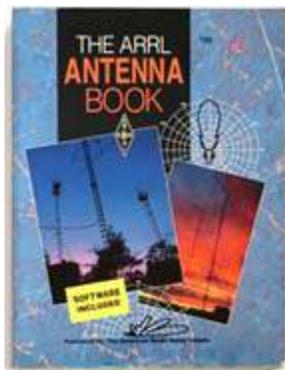
“While my text goes more deeply into antenna theory, this book [ARRL *Antenna Book*] covers the practical and constructional aspects in more detail. The two books are complementary. The one supplementing the other. Anyone who wants to know what steps to take to build or improve an antenna will find this enlarged edition of *The ARRL Antenna Book* indispensable.”



Horizontally polarized W8JK flat-top array with two closely-spaced $\lambda/2$ elements carrying equal out-of-phase currents. [After 'Antennas' by John D. Kraus.]

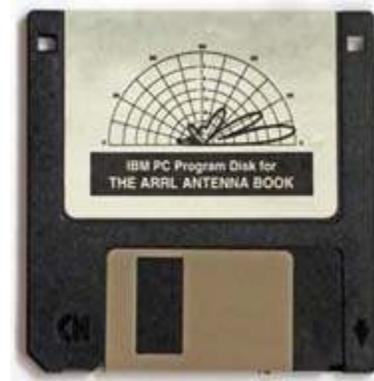
Seventeen megaflops

The next *Antenna Book* on my shelf is the 17th Edition, published in 1994. There are more program listings within its pages, including “TAPER” written in Microsoft BASIC version 5.28 to calculate the lengths of a tapered half wave element and “GAMMA” which calculates the dimensions of a gamma-



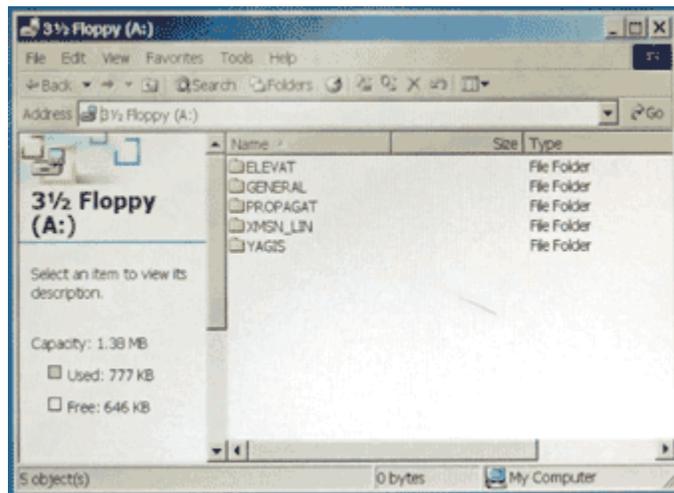
17th Edition of 1994.

match for dipole or monopole antennas. These programs were included on a 3½ inch 1.44 megabyte “IBM PC Program Disk” fixed to the back page, along with “Yagi Analyzer” by Brian Beezley, K6STI and “Transmission Line” by Antenna Book editor Dean Straw, N6BV.



3½ inch 1.44 MB floppy disk included with 17th Edition.

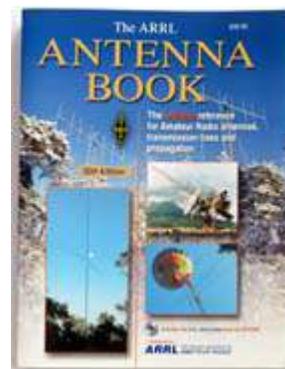
I still have one computer with a 3½ inch floppy drive... amazingly enough, that 1994 diskette is still readable, twenty six years later.



Contents of 3½" diskette included with the 17th Edition.

Compact twenty

The 20th edition of the ARRL *Antenna Book*, also edited by R. Dean Straw N6BV, appeared in 2003. This is a weighty volume — 944 pages. Adding to the weight is a CD-ROM in a plastic sleeve, bound into the back page. After cleaning off vinyl gunk from the CD-ROM's surface, this disk was still readable in my desktop PC.



20th Edition of 2003.

One advantage of including a CD-ROM — as introduced with the 19th Edition in 2000 — is the much larger space available for software and other files. My 20th edition CD-ROM contains 348 MB-worth of data including full text and diagrams of the printed book in PDF format — still readable today using Adobe Acrobat.

The CD-ROM also included an “EZNEC-ARRL” demo version of Roy Lewallen W7EL's EZNEC 3.0



CD-ROM included with the 20th Edition Antenna Book contains 348 MB of text, illustrations and software.

Line for Windows” (TLW) — well worth the purchase price of the book.

Heavyweight 22

Next on my bookshelf is the 22nd Edition *Antenna Book*, published in 2011. My copy is even weightier than number 20 because it is a **hardback** version, purchased from KJI Electronics. The Editor had changed to H. Ward Silver, N0AX — editor of the ARRL Handbook plus many other columns and publications about radio.

Once again, there is a CD-ROM, contained this time inside a cardboard sleeve, which was bound in with the last page. The 662 MB of content includes full text and illustrations of the printed book in multiple PDF files. Those PDF files are now several levels down in the CD’s folder structure, but there is a Setup program which will install the book’s content onto your hard drive, along with a large number of “Supplemental Files”, mostly articles from earlier volumes of *QST*.

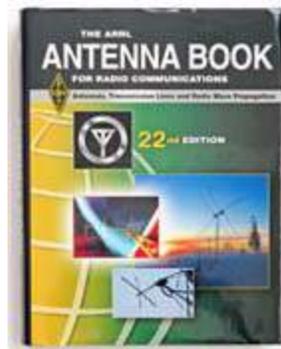


CD-ROM in cardboard sleeve bound into the 22nd Edition.

On the CD is a newer version of EZNEC-ARRL, which is a demo version of the antenna modeling software EZNEC 5.0. This is restricted to 50 segments — unless working with specially-signed ARRL antenna files included on the CD-ROM. The computer software “Transmission Line Program for Windows” (TLW) and

antenna modeling software. The ARRL demo version is restricted to 20 segments but has full 500-segment capabilities when operating with specially-signed ARRL antenna files.

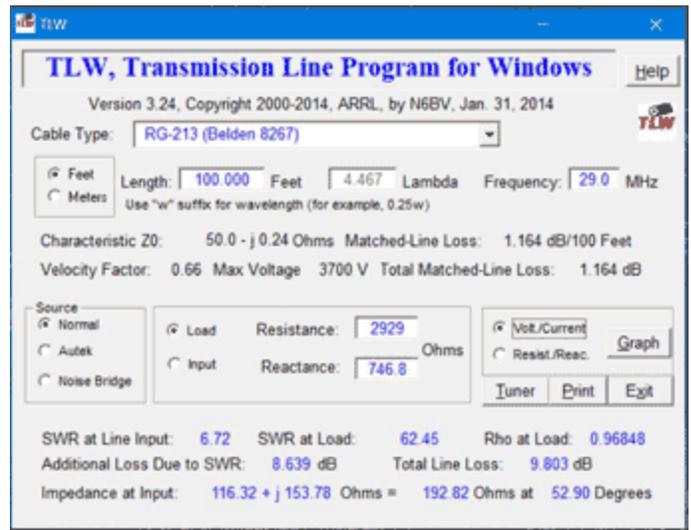
Programs written by *Antenna Book* editor Dean Straw N6BV now appear on the CD in versions for Microsoft Windows. They are “Yagi for Windows” (YW) and “Transmission



22nd Edition Antenna Book was purchased as a hardback.

Line for Windows” (TLW) — well worth the purchase price of the book.

“Yagi for Windows” (YW) are also present. Taking up additional space are a large number of Propagation Prediction tables — they show the likely signal strength between different parts of the world during periods of high, low and medium sunspot activity.



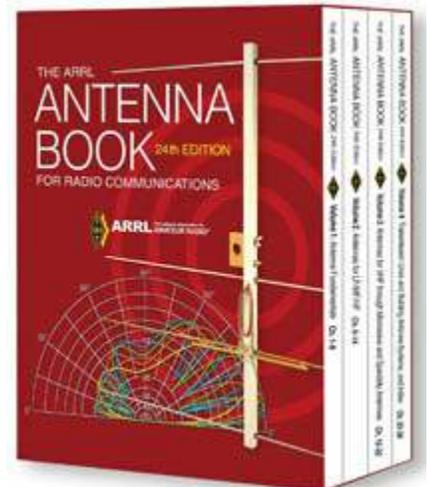
TLW, Transmission Line Program for Windows, by Dean Straw N6BV shown calculating the loss in 100 ft of RG-213 coaxial cable feeding a G5RV antenna on 29 MHz.

Latest and greatest

The 24th edition of the ARRL *Antenna Book* appeared at the end of 2019. If you decide to purchase, there are several choices. You can order the four-volume Boxed Set which arrives in a hard slip-case for shelf storage. You can also order the less-expensive single-volume ‘Softcover’ Book which has 1024 pages and weighs 4½ pounds.

Less expensive and less weighty are the two **eBook** versions, for Windows or Macintosh/Linux. They contain full text and diagrams plus supplemental material, while the Windows version also includes software.

When I placed my order, I chose the soft cover book. There is **no** floppy disk or CD-ROM included this time — the files have grown even larger and CD-ROM drives have mostly disappeared from modern computers. Instead, bound into the front of the book you will



24th Edition of the ARRL Antenna Book is available as a weighty four-volume boxed set as well as in softcover.

find a second cover page: “Supplemental Material – Download Included with Purchase of This Book”.

Go online

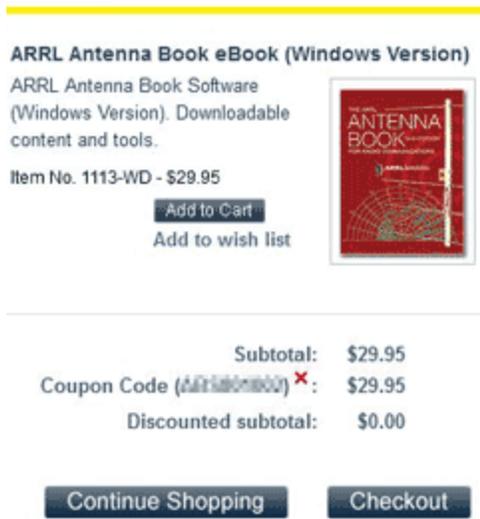
Downloading of the supplemental material has a time limit — so I decided to retrieve the files without delay. The procedure is to visit the ARRL Store on the League’s web site and add the ARRL Antenna eBook to your cart then proceed to checkout.

Normal price for the eBook is \$29.95, but when you apply the special Coupon Code bound into the printed book, the eBook cost is discounted for a new total of \$0.00.

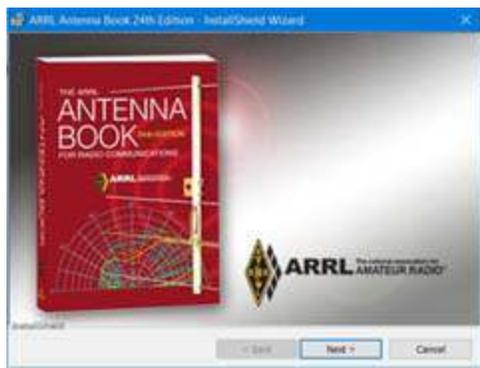
The ARRL then sends an e-mail with a special URL to download their electronically-distributed product. The ID code is only good for 7 days — so don’t delay. I went back to my browser and successfully downloaded “ARRL_Antenna_Book_Setup.exe”, which took a short while over my cable modem as the file size is 623 MB.

Running the program provides a choice of Typical or Custom Setup — the latter allows individual components to be installed, with a choice of destination. Typical setup results in an additional 701 MB of disk space being occupied by the text and illustrations — in PDF and zipped PDF formats — plus software and data files, including 250 MB of propagation predictions.

If you do not want to add a total of **1.3 GB** to your hard drive (a significant load on smaller SSDs) you can always install to a removable device, such as a USB flash drive. The license allows use of the software on a single computer, transfer to another computer and



To download the supplemental material, add the eBook to your cart at the ARRL Store, then apply the Coupon Code bound into the front of the printed book.



ARRL Antenna Book Setup program.

making one copy for backup purposes. If you would like to keep your backup copy taped inside the printed Handbook, I suggest saving to an **SD-card** or micro-SD card.

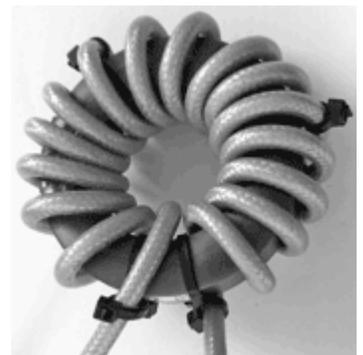
The EZNEC-ARRL special demo version is no longer included with the *current* Antenna Book, but the free demo of EZNEC version 6.0 which is downloadable from <https://www.eznec.com/> continues the book’s tradition. For standard antenna files, the v 6.0 demo version’s segment limit is 20, but when analyzing a “signed” ARRL file, the program behaves like the standard program with a 500 segment limit. There are over 400 .EZ antenna files included in the *Antenna Book* download, many of which are ARRL-signed. For the other files a full-function standard version of EZNEC v6.0 will cost you \$99.00 when purchased from Roy Lewallen W7EL’s web site.

Two-to-the-power-ten = 1024

Reviewing the content of a 1024 page book is no easy task. Some topics are familiar from previous editions, while others are new or revised and bear careful study. The chapter on Antenna Modeling makes good use of the included collection of EZNEC antenna files.

I was particularly interested in section 24.7 on “Current Baluns, Chokes and Choke Baluns” where recommendations have been changing. I had been reading “Reflections II” by Walt Maxwell W2DU, (CQ Publications 2010) describing W2DU’s ferrite bead choke baluns where the coax is threaded through a series of ferrite beads. This approach is described in the current *Antenna Book*. Previous *Antenna Books* also recommend winding RG-8X coaxial cable through a stack of ferrite toroids to make a choke balun, or adding 1-2 large ferrite beads to an air wound coil of coax. The latest recommendation in the 24th edition is based on measurements by K9YC and W6GJB and suggests winding Teflon-insulated coax (RG-400) around a single 2.4 inch toroid.

Your editor has long had an interest in anten-



Antenna Book explains how to construct ferrite chokes using 0.195" dia. RG-400 coax wound around a single toroid.

nas for medium and low frequencies, dating back to early days operating on 160 meters, admiring BBC MF/LF transmitter sites and viewing the 820 ft masts of Rugby VLF transmitting station from a British Rail train as it passed through the UK Midlands. The new *Antenna Book* has an addition to Chapter 9



Twelve 820 ft masts supported the 16 kHz wire antenna at former VLF transmitting station GBR, Rugby.

“Single Band MF and HF Antennas” by Rudy Severns N6LF on antennas for the 2200 meter and 630 meter amateur bands. This is a world of T-antennas for top-loading and large base-loading coils to improve radiation efficiency. For those with limited space, we can dream about having enough room to try out these designs.

Much of the ARRL *Antenna Book* is in a similar vein, for those dreaming about acres of antenna farms — or the next Field Day when we can pull up large antennas again. But there are also projects for VHF/UHF where the dimensions are more manageable. Order a copy for your own dreams and practical realities.

- NM9J

New York QSO Party-2020

In previous years Peekskill/Cortlandt Amateur Radio Association has operated in the New York QSO Party by kind invitation of Joe WA2MCR. Joe’s sunroom provided an excellent location to accommo-



NYQP 2016 with Charles N2SO operating at WA2MCR’s.

date visiting operators, with a fine view of the yard and Joe’s wire antennas slung from tall trees.

With COVID-19 trending upward, a different plan was needed in 2020 to avoid multi-op guest operators turning up at Joe’s location.

PCARA took advantage of the New York QSO Party rule (see <https://nyqp.org/wordpress/>) that includes a “Special Achievement Award” for ‘New York Club - High Score’. This award is marked by a Plaque sponsored by Vic Gauvin, K1PY.

Arrangements for the award are described in the NYQP FAQ document:

“What about the members of my radio club?”

“The NYQP is designed to be fun. We have everything you need to enjoy the NYQP with your friends. There are Multi Operator entries classes in both the fixed and mobile classes Why not get your entire club involved? There is a plaque for the most combined points turned in. Make sure your log specifies your club affiliation to get the proper credit.”

Sunny Saturday

Saturday October 17th dawned fine and sunny, if a little cool. A PCARA Breakfast had been arranged for 9:00 a.m. at Downing Park Pavilion. This was followed by the QSO Party starting at 10:00 a.m. Eastern, continuing through to 10:00 p.m. that same night.

Traditional host Joe WA2MCR had a conflicting appointment on the Saturday morning so your Editor took advantage of the lack of strong, nearby signals to operate from home. This amicable arrangement allowed me to stay on the air without QRM from roughly 11:00 a.m. to 5:00 p.m., by which time Joe had returned and fired up his own contest station, with club call W2NYW.

My own experience was that 40 meters was the most active band, with 80 meters opening up as evening approached. Twenty meters is usually awash with “Jamboree on the Air” stations that weekend, but only one JOTA station was noted — perhaps Scouts are also suffering from COVID-19 restrictions. Plenty of DJ, DL and DK stations were taking part in the 60th ‘Worked all Germany’ Contest, sponsored by the Deutschen Amateur-Radio-Club (DARC).

From past experience, I avoided calling CQ — out-of-state stations tend to assume that a Nine-Land call



NY QSO Party map of the 62 New York State counties.

means a non-New York location, limiting contacts. The prefix still caused problems for a few stations who were expecting to hear “IL, IN or WI” as the QTH rather than **WES** for Westchester. I was using N3FJP’s New York QSO Party Contest Log software — which worked well for me.



Operating position for the New York QSO Party, with N3FJP logging software on the NM9J notebook.

Participant scores

I received information from five other PCARA members regarding their entries in the New York State QSO Party, 2020. Our claimed QSOs and Total scores are summarized below. In NYQP, each phone contact scores one point while CW contacts score two points and RTTY/digital contacts score three points. Total score is the total number of QSO points times the total number of multipliers — selected from U.S. states worked (50 max), NY Counties (62 max) and Canadian Provinces worked (9 max) for a maximum multiplier of 121.

PCARA members’ claimed scores

Call sign	QSOs	Total score
K2WPM	260	19,500
WA2MCR	179	14,625
N2SO	115	11,904
NM9J	55	2,542
KD2ITZ	17	476
N2HTT	4	16

Charles N2SO was operating from home in the Single Operator – High Power – CW-only class/power/mode, using his Elecraft transceiver and amplifier with OCF dipole antenna. Charles’ station had suffered a damaging power surge during the summer storms but is now back on the air.

Joe WA2MCR was not operating from his sun room this year but was instead on the air from his normal basement shack using ZS6BKW and Carolina Windom antennas over the period 2:30 – 9:00 p.m.

David K2WPM was operating portable from Putnam County, combining NYQP with Parks on the Air activations (<https://parksontheair.com/>). He ran into a problem with the N3FJP software not allowing entry of ‘DX’ for countries outside North America, but was able to fix this for the submitted entry.



Mike N2HTT and Lou KD2ITZ were both operating from home at a more leisurely pace, with Mike on and off during the day and Lou operating for only 90 minutes — but both scores will add to the total for PCARA.

Watch for final results to be posted on the NYQP web site around March 2021. We should find out whether any clubs managed to stage multi-operator entries and who might have won the PCARA-sponsored plaques for “New York Multi-One, Low Power” and “Non-NY SSB Low Power”.

- NM9J

W2NYW license

PCARA’s Trustee Bob, N2CBH advises that the Club license for call sign **W2NYW** was recently renewed by FCC. The ten year license term now extends to **November 3, 2030**.

An interesting aspect of the renewal process mentioned by Bob is that an “Amateur Club or Military Recreation” license is the only type that cannot be renewed by an individual at the FCC ULS web site. Instead, renewal must be submitted through a Club Station Call Sign Administrator, one of which is the ARRL-VEC. Once ARRL Form 605-C is submitted, ARRL will then send details electronically to the FCC where processing is quite rapid.

ARRL-VEC can also take care of standard amateur license renewals/changes using NCVEC Form 605, as employed at V.E. Tests for new licenses and upgrades. Renewals are free for ARRL members. Full details are available on the following web page: <http://www.arrl.org/call-sign-renewals-or-changes> .



Peekskill / Cortlandt Amateur Radio Association

Mail: PCARA, PO Box 146, Crompond, NY 10517

E-Mail: mail 'at' pcara.org

Web site: <http://www.pcara.org>

PCARA on Facebook: <http://facebook.com/pcarahamradio>

PCARA Update Editor: Malcolm Pritchard, NM9J

E-mail: NM9J 'at' arrl.net

Newsletter contributions are always very welcome!

Archive: <http://nm9j.com/pcara/newslett.htm>

PCARA Information

PCARA is a **Non-Profit Community Service**

Organization. PCARA meetings take place the first Sunday of each month (apart from holidays and July/August break). Talk-in is available on the 146.67 repeater.

PCARA Repeaters

W2NYW: 146.67 MHz -0.6, PL 156.7Hz

KB2CQE: 449.925MHz -5.0, PL 179.9Hz

N2CBH: 448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

Masks and social distancing are required.

Sat Nov 7: PCARA monthly meeting, 9:00 a.m. John C. Hart Library porch.

Sat Nov 7: PCARA V.E. Test Session, 11:00 a.m. John C. Hart Library porch.

Sat Nov 21: PCARA Breakfast. Location to be determined.

Hamfests

Most local Hamfests scheduled for fall 2020 have been canceled. Check with organizers before leaving.

Fri Nov 27: Fair Lawn ARC Auction — Canceled.

Sat Jan 9 2021: Ham Radio University - now a Virtual Event.

VE Test Sessions

Many fall VE Test Sessions have been canceled. Check with the contact before leaving.

Nov 4: Orange County ARC, Algonquin Park 52 Powder Mill Rd Newburgh NY. 11:00 a.m. Must contact Joseph J. DeLorenzo W2BCC, (845) 534-3146.

Nov 7: PCARA, John C. Hart Library porch, 1130 E Main St, Shrub Oak, NY. 11:00 a.m. Must contact Michael Dvorozniak W2IG, w2igg'at'yahoo.com, (914) 488-9196.

Nov 14: WECA, Masonic Guild of Mount Kisco, 11 Carpenter Ave, Mount Kisco NY. 10:00 a.m. Must contact Stan Rothman WA2NRV (914) 831-3258, wa2nrv'at'weca.org



Peekskill / Cortlandt Amateur Radio Association Inc.
PO Box 146
Crompond, NY 10517